

SIEMENS

CHX 200, a new intelligent HF Radio Communications System



CHX 200, the versatile frequency hopping HF transceiver family

A completely new system concept

With the CHX 200, Siemens has created a new generation of intelligent HF radio communications equipment that covers all the military needs of both today and tomorrow. It is designed for use in mobile and fixed stations. The CHX 200 modular concept provides different power stages that add on to the basic receiver/exciter unit to form a family of HF transceivers for low, medium and high-power stations. This family concept, in which the various units such as receiver/exciter, FSK modem

and communications processor are common to low, medium and high-power stations, brings important advantages in terms of operational versatility, economy and ease of maintenance. In addition, the communications processor provides a number of significant innovative features that facilitate operation by unskilled personnel, improve communication security and increase transmission reliability.

Extreme flexibility

The system is suitable for short, medium and long range communications for all tactical and strategic applications. It is able to transmit voice, telegraph, data and facsimile traffic. A variety of antennas ranging from whip antennas, rod antennas, dipoles, log periodic antennas to loop antennas can be connected to the transceiver either directly to the power amplifier or via automatic antenna tuning units.



Outstanding features

Special features realized in this system will contribute to meet also military requirements of tomorrow:

- extreme simple operation including automatic link build-up and clear down, RF channel quality test and selective calling by automatic channel selection (ACS)

- reliable telegraph and data transmission by ARQ and FEC protection
- high ECM resistance by frequency hopping and burst modes for voice and data transmission
- high communication security by telegraph and data encryption
- fast selection of up to 16 x 32 channels preprogrammed
- control unit with display permitting remote operation in all modes.

Easy to maintain

Ease of Maintenance is a key factor of the total communications system

- quick and simple checking procedure with Built-in-test Equipment (BITE)
- modular construction
- interchangeability of the units without retuning.



CHX 200, a low, medium and high power for mobile and stationary applications

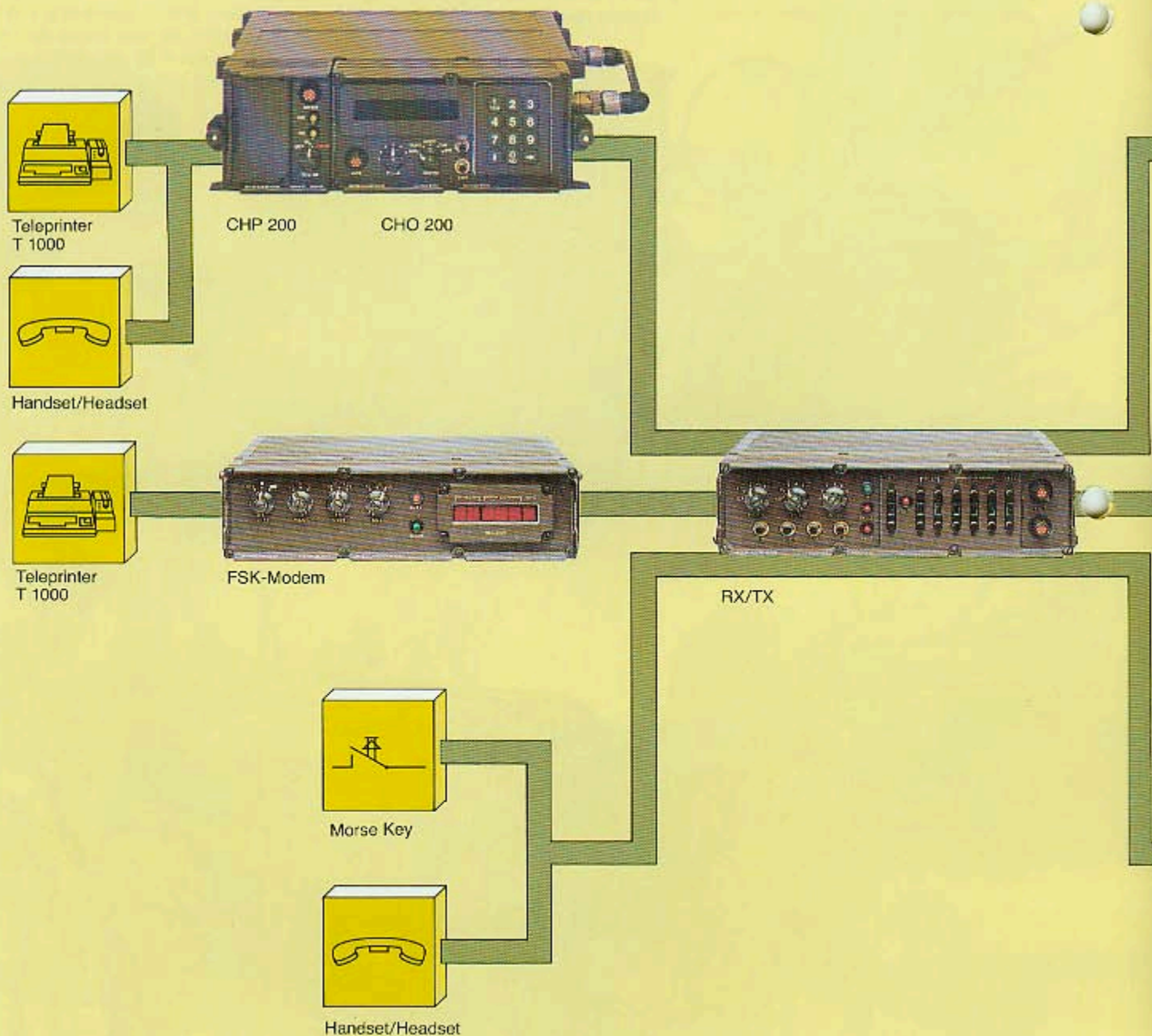
Communications processor CHP 200 with the Control unit CHO 200

The CHP 200 is a microprocessor-controlled unit which permits automatic establishment of HF radio links, data protection by ARQ and FEC methods, encryption and ECM resistant operating modes.

The CHO 200 is detachable but an integral part of the CHP 200. The control unit initiates operational modes of the CHX 200 system, gives alarm indications and exercises internal tests (BITE).

FSK modem

Suitable for mode of operation F1B (F1) and direct connection of a teleprinter. It provides telegraph data transmission modes (± 85 Hz and ± 425 Hz frequency shift selectable). Not needed if CHP 200 is used.



Power HF transceiver family

Receiver/exciter RX/TX

The basic unit of the system. It contains exciter, receiver and synthesizer. It has been designed to provide optimal communication features like excellent large signal behavior, high frequency accuracy and spurious suppression.

Power amplifier

PA 100/20, PA 400

Fully transistorized broad band amplifiers with high packing density. HF power stages rated 100/20 W and 400 W. Electronic transmit receive switching.

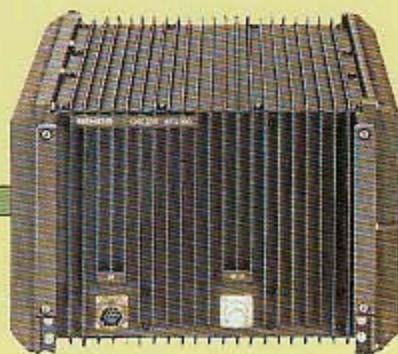
Antenna tuning units

ATU 100, ATU 400

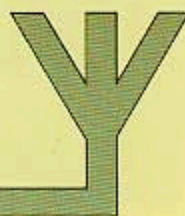
Match automatically antennas with small electrical length (e.g. whip antennas). For HF power of 100 W the unit can be combined with the power amplifier, for 400 W it is available as a separate unit. Both units are digitally controlled. Tuning time less than two seconds.



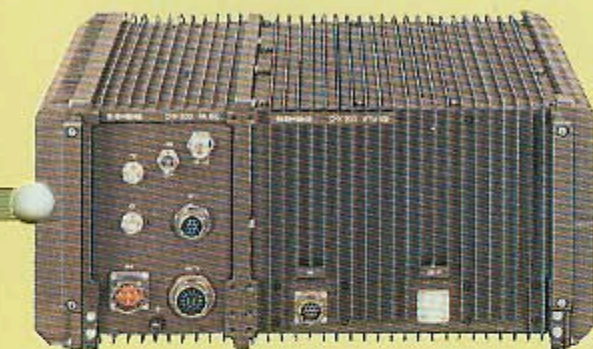
PA 100/20



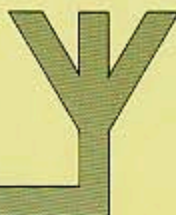
ATU 100



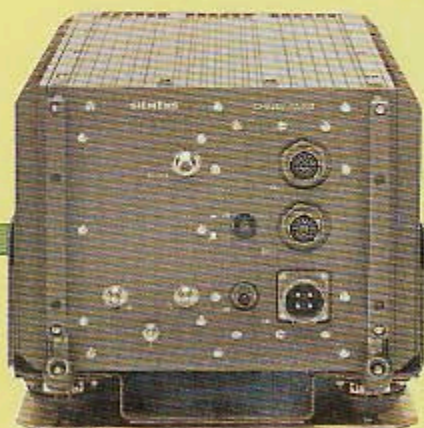
CHX 210



PA/ATU 100/20



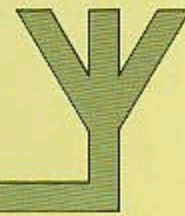
CHX 210



PA 400



ATU 400



CHX 240

CHP 200, the Communications Processor provides:

CHP 200



Precautions against Interception

by

- Encryption of traffic and control signals
- Burst transmission and frequency hopping modes

Precautions against Jamming

by

- Data protection (ARQ and transmission with redundancy)
- Burst transmission and frequency hopping modes

Measures to increase Reliability

by

- Automatic channel selection
- Data protection methods

Measures to facilitate Operation

by

- Automatic channel selection with selective calling
- Microprocessor aided control of radio stations via control unit

CHO 200



The control unit CHO 200 is an integral part of the communications processor CHP 200 and it provides the operational and display elements for the below explained operational modes. For easier operator handling the CHO 200 can be detached from the CHP 200 and used as a local external control device.

Automatic Channel Selection

This facility gives the user the ability to establish HF connections in the same way as he would utilize a normal dial telephone or telex network, just by selecting the number he wants. The connection is then established automatically. During the selection or during the traffic if the quality of the channel in use deteriorates another channel is automatically selected from a set of predefined frequencies.

Frequency Hopping

This facility gives the user the ability to avoid the worst effects of HF jamming (EW activity). The frequency in use is changed several times per second according to a pseudorandom timing sequence determined by a code set by the user.

Burst Transmission

This facility gives the user extremely good protection against jamming and monitoring. The coded messages are sent in short bursts which are difficult to detect and thus difficult to jam. Data bursts are transmitted by pressing a command key on the control unit.

Data Protection

The transmission of encrypted messages over HF links requires a particularly high degree of reliability which can only be obtained with data protection by using redundant codes. The communications processor CHP 200 applies ARQ or FEC data protection.

Technical Data

General data		
Frequency range	1.5 to 30 MHz	
Frequency steps	100 Hz	
Frequency memory for	9/10x32 frequencies	
Class of emission	CW	A1A (A 1)
	SSB	H3E (A3H)
	FSK	J3E (A3J) USB, LSB F1B (F1): ± 85 Hz and ± 425 Hz data at 50/100/200 bauds
Frequency stability	better than $\pm 1 \times 10^{-7}$	
Supply voltage	24 V DC, variations from 19 to 31 V permissible	

Operating temperature range	-30 to +60°C
Shock and vibration	according MIL-STD 810 C, Group 1 D

Transmitter data		
Output power at nominal voltage across 50 ohms		
CHX 240	400 W PEP and average	
CHX 210	100 W PEP and average	
Reducible by	6 dB	
Duty cycle	continuous operation	
Spurious-signal suppression	≥ 60 dB	
Harmonic suppression	≥ 40 dB	
Suppression of 3rd order inter- modulation products with two-tone drive, referred to 400/100 W PEP	≥ 32 dB	
Carrier suppression in class of emission J3E (A3J)	≥ 40 dB	
AF frequency response	350 to 2950 Hz	

Receiver data		
Sensitivity		
A1A (A1)/F1B (F1):		
$\frac{S+N}{N} = 10$ dB at B = 450 Hz	$V_{in} \leq 0.25 \mu V$	
J3E (A3J)/H3E (A3H):		
$\frac{S+N}{N} = 20$ dB at B = 2.7 kHz	$V_{in} \leq 2 \mu V$	
Bandwidth	USB	2.7 kHz (6 dB)
	LSB	2.7 kHz (6 dB)
	A1A/F1B	approx. ± 260 Hz (6 dB)

IF rejection	≥ 70 dB
Image frequency rejection	≥ 60 dB
3rd order intermodulation suppression with two equal input signals of -20 dBm	≥ 60 dB
Transmit/receive changeover	approx. 10 msec
Gain control J3E (A3J)	
Output voltage variation for $V_{in} = 2 \mu V$ to 0.2 V	≤ 4 dB
Audio output	10 mW min. at 300 ohms $\leq 5\%$ distortion

Communications Processor data	
Automatic channel selection	10 frequency pools, each of 32 preprogrammed frequencies
Selective calling	100 addresses
Data protection ARQ FEC	24/36 Code time diversity
Burst transmission	burst length 230 msec
Frequency hopping	for data and voice
Encryption	high grade digital

Antenna Tuning Unit data	
Matchable antennas	whip and rod antennas
Mode of tuning	fully automatic
Tuning time	typ. 1.5 s

Dimensions, weight	dimensions in mm	weight
with shock mount	(W x H x D)	in kg
Receiver/exciter with FSK modem	350 x 215 x 350	12
Power amplifier PA 400	335 x 300 x 595	36
Antenna tuning unit ATU 400	430 x 315 x 545	30
Power amplifier with antenna tuning unit PA/ATU 100	445 x 265 x 430	24
Receiver/exciter with communications processor CHP 200	350 x 230 x 350	15
Power supply/battery charger PS 400 230 V/24 V	335 x 300 x 580	33
Power supply/battery charger PS 100 230 V/24 V	276 x 265 x 400	16

For further information please contact
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